UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/670,251	09/26/2000	Mukund Padmanabhan	YOR92000390	5892

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FERENCE & ASSOCIATES
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EXAMINER
LERNER, MARTIN

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 02/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _21 October 2004_.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1 to 15_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1 to 15_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☒ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _7_.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Specification

1.   The disclosure is objected to because it contains an embedded hyperlink and/or

other form of browser-executable code. Applicants are required to delete the

embedded hyperlink and/or other form of browser-executable code. See MPEP §

608.01. Page 6, Line 11, of the Specification contains an embedded hyperlink.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.   Claims 1, 7, 8, 14, and 15 are rejected under 35 U.S.C. 102(b) as being

anticipated by *Woodland et al. ("Iterative Unsupervised Adaptation Using Maximum*

Likelihood Linear Regression").

Regarding independent claims 1, 8, and 15, *Woodland et al.* discloses a method,

apparatus, and computer program for adaptation in speech recognition, comprising:

"providing at least one speech recognition model" – gender independent Hidden

Markov Models (HMMs) HMM-1 and HMM-2 are built from acoustic training data sets

consisting of 36,493 sentences (Page 1134, Left Column, Paragraphs 4 to 7; Page

1135, Right Column, Paragraph 3);

"accepting speaker data" – test H3-P0 data was captured for each speaker of 20

speakers (Page 1134, Right Column, Paragraph 7);

"generating a word lattice having a plurality of paths based on the speaker data"

– H3 development test data is used for lattice generation (Page 1135, Left Column,

Paragraphs 3 to 5: Table 1); word lattices are used to generate an error rate for H3-P0

data (Page 1136, Left Column, Lines 1 to 6: Table 3); implicitly, a word lattice has a

plurality of paths;

"adapting at least one of the speaker data and the at least one speech

recognition model with respect to the generated word lattice in a manner to maximize

the likelihood of the speaker data" – language models were trained on the text training

corpus and the H3 text data sets; HMM-1 models used global MLLR adaptation and

specific MLLR adaptation from word lattices for H3-P0 data; the result is a decreased

error rate by adapting HMM-1 ("speech recognition model") to H3 data ("speaker data")

using MLLR (Maximum Likelihood Linear Regression") (Page 1135, Right Column,

Paragraph 5 to Page 1136, Right Column, Paragraph 2: Table 3).

Regarding claims 7 and 14, *Woodland et al.* discloses maximum likelihood linear

regression (MLLR) for adaptation of speaker data in speech recognition (Page 1133).

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims 2 to 6 and 9 to 13 are rejected under 35 U.S.C. 103(a) as being

unpatentable over *Woodland et al.* in view of *Nguyen et al.*

Concerning claims 2 and 9, *Woodland et al.* discloses generating word lattices,

but omits generating word lattices by maximum a-posteriori adaptation. However,

Nguyen et al. teaches adaptation by both Maximum Likelihood Linear Regression

(MLLR) and Maximum A Posteriori (MAP) adaptation, noting that both techniques are

available to perform adaptation. It is stated that Bayesian-based MAP techniques are

particularly useful in dealing with adaptation of sparse data sets, but in practical

applications, depending upon the amount of adaptation data available, a combination of

both MLLR and MAP may be used. (Column 1, Lines 50 to 60) Thus, *Nguyen et al.*

performs adaptation with both MLLR and MAP. (Column 3, Line 57 to Column 4, Line

32) It would have been obvious to one having ordinary skill in the art to generate a

word lattice with maximum a posteriori adaptation as taught by *Nguyen et al.* in the

MLLR adaptation with word lattices of *Woodland et al.* for the purpose of dealing with

adaptation of sparse data sets in H3 training data.

Concerning claims 3 and 10, *Nguyen et al.* discloses Bayesian adaptation by

MAP with Equation 4; γ is the observed posterior probability of the observation to adapt

the speech models ("posterior state occupancy probability"); μ_{MAP} is found by summing

the observed posterior probabilities over time: $\Sigma \, \gamma(t) \, o_t$ and $\Sigma \, \gamma(t)$ ("posterior word

occupancy probabilities by summing over all states interior to a word") (column 4, lines

10 to 23); the adaptation system then processes the segments in an N-best pass to

collect the most probable labels; model adaptation may be performed to adapt speech

models to words ("at least one likely word at each frame") (column 3, lines 1 to 8;

column 3, lines 47 to 56).

Concerning claims 4 and 11, *Woodland et al.* discloses word lattices (Page 1135,

Left Column); a word lattice implicitly contains word traces.

Concerning claims 5 and 12, *Woodland et al.* discloses pruning during adaptation

(Paragraph Bridging Pages 1135 to 1136), but does not expressly discard

interpretations associated with low confidence. However, *Nguyen et al.* teaches

assigning weights to the N-best transcriptions, so that reliable information becomes

enhanced by a positive weight, and unreliable information is correspondingly diminished

by a negative weight. The system thus tends to push models that generate incorrect

labels away from those that generate correct ones. Subsequently, model information is

accumulated among the N-best transcriptions for the entire set of sentences and then

used to adapt the speech models. (Column 3, Lines 32 to 56; Column 4, Lines 23 to

59) Taking the N-best of the most reliable transcriptions necessarily implies eliminating

transcriptions not associated with the N-best most reliable transcriptions ("discarding

interpretations associated with low confidence"). N-best techniques are well known in

speech recognition. *Nguyen et al.* says assigning weights to the N-best transcriptions

corresponding to their likelihoods produces a natural information and data corrective

process. (Column 3, Lines 31 to 34) It would have been obvious to one having ordinary

skill in the art to utilize the N-best technique of *Nguyen et al.* to discard unreliable

transcriptions for pruning in the MLLR adaptation with word lattices of *Woodland et al.*

for the purpose of producing a natural information corrective process.

Concerning claims 6 and 13, *Nguyen et al.* discloses Bayesian adaptation by

MAP with Equation 4; γ is the observed posterior probability of the observation to adapt

the speech models ("posterior phone probability") (column 4, lines 10 to 23); the

observations and labels represent phonemes in speech recognition.

Response to Arguments

6.   Applicants' arguments filed 21 October 2004 have been fully considered but they

are not persuasive.

Firstly, Applicants describe the results of the interview conducted on 14 July

2004 in the Remarks: "It was agreed that in view of the amendments made to the claims

herein, the claims appeared to be allowable over the references of record." This is

traversed.

No such agreement was reached. The attached Interview Summary, Form PTO-

413, describes the interview as non-conclusive. Specifically, it was stated that the

phrase of adapting "with respect to the generated word lattice" was vague. No

agreement was reached as to language to render the claims allowable, nor was any

agreement implied. The only valid interpretation of Applicants' statement is that

Applicants' representative is referring to an agreement among assignees or inventors

that they believed the amendments would make the claims allowable.

Secondly, Applicants state they disagree with the objection to the disclosure as

containing improper hyperlinks. Applicants point to U.S. Patent No. 6,705,943 as

containing a hyperlink in an issued patent. Applicants also contend that the web

address in the Specification is contained with brackets "[ ]". This position is traversed.

Applicants' hyperlink is improper. Applicants' hyperlink, on Page 6, Line 11 of

the Specification, can be distinguished from the hyperlink of U.S. Patent No. 6,705,943,

which is cited as prior art by the examiner. MPEP 608.01 VII clearly states: "This

requirement [to delete hyperlinks] does not apply to electronic documents listed on

forms PTO-892 and PTO/SB/08 where the electronic document is identified by

reference to a URL." The hyperlink of U.S. Patent No. 6,705,943 was cited as prior art

by the examiner, and so this is a document listed on Form PTO-892. Applicants'

hyperlink is cited as prior art by Applicants in the body of the Specification, and thus not

on Forms PTO-892 or PTO/SB/08. Nor does MPEP 608.01 VII provide any exception

for hyperlinks contained in brackets. An exception is provided "[w]here the hyperlinks

and/or other forms of browser-executable codes themselves rather than the contents of

the site to which the hyperlinks are directed are part of applicant's invention". It follows

that the Specification can properly contain hyperlinks only when the nature of the

invention concerns hyperlinks, e.g. a patent application the subject matter of which is

directed to electronic commerce. That is not the case here, as Applicants are simply

citing prior art in the body of the Specification. Moreover, it should not be dispositive

even supposing Applicants can find an instance of an improperly cited hyperlink in an issued patent as contrary to the general policy.

Thirdly, Applicants traverse the rejection under 35 U.S.C. §102(b) as being anticipated by *Woodland et al.*, and under 35 U.S.C. §103(a) as obvious over *Woodland et al.* in view of *Nguyen et al.* Applicants say the instant claims, as amended, recite "generating a word lattice *having a plurality of paths* based on the speaker data" and "adapting at least one of the speaker data and the at least one speech recognition model *with respect to the generated word lattice* in a manner to maximize the likelihood of the speaker data". Applicants state that the invention takes into account language model probabilities, but there is no teaching or suggestion of taking into account language model probabilities in *Woodland et al.*

However, the claims do not say anything about language model probabilities. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants only amendments to the claims are to insert "having a plurality of paths" as descriptive of a word lattice, and to reposition the phrase "with respect to the generated word lattice" from the end to the middle of the final clause. These amendments do not serve to distinguish over *Woodland et al.*, which discloses word lattices on Page 1135, Left Column, Paragraphs 3 to 5: Table 1 and on Page 1136, Left Column, Lines 1 to 6: Table 3. It is maintained that those skilled in the art know that word lattices, by their very nature, have a plurality of paths. A lattice, in the current

context, can be defined as an array of points. Merriam-Webster's Online Dictionary, 10th Edition, defines a lattice as "a regular geometrical arrangement of points or objects over an area or in space". More specifically, the Dictionary of Cybernetics and Systems defines a lattice as "a regular arrangement of points and lines with or without arrows connecting them directly or indirectly, a graph systematically constructed by a rule." It should be clear to one skilled in the art that a lattice of points provides for a plurality of paths between the edges of the lattice.

Woodland et al. discloses adapting at least one speech recognition model with respect to the generated word lattice, as claimed. HMM-1 models use global MLLR adaptation and specific MLLR adaptation from word lattices for H3-P0 data. The result is a decreased error rate by adapting HMM-1 ("speech recognition model") to H3 data ("speaker data") using MLLR (Maximum Likelihood Linear Regression"). See Page 1135, Right Column, Paragraph 5 to Page 1136, Right Column, Paragraph 2: Table 3. Thus, *Woodland et al.* teaches adapting the speech recognition model with respect to the generated word lattice in a manner to maximize the likelihood of the speech data.

Therefore, the rejections of claims 1, 7, 8, 14, and 15 under 35 U.S.C. 102(b) as being anticipated by *Woodland et al.*, and of claims 2 to 6 and 9 to 13 under 35 U.S.C. 103(a) as being unpatentable over *Woodland et al.* in view of *Nguyen et al.*, are proper.

Conclusion

7.   **THIS ACTION IS MADE FINAL.** Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

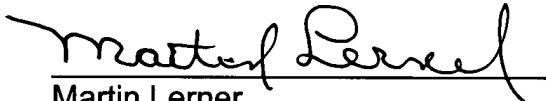than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Martin Lerner whose telephone number is (703) 308-

9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to

Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone

number for the organization where this application or proceeding is assigned is 703-

872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

ML
2/16/05

Martin Lerner
Examiner
Group Art Unit 2654